Problem A. Add Them All!

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	1024 mebibytes

You are given two sequences of positive integers of length n: $(a_1, a_2, \ldots, a_n)$ and $(b_1, b_2, \ldots, b_n)$.

For $k = 2, 3, \ldots, 2n$, compute the value of

$$\sum_{i+j \le k} (a_i + b_j),$$

that is, the sum of $(a_i + b_j)$ for all pairs of indices (i, j) such that $i + j \le k$ and $1 \le i, j \le n$.

Input

The first line of the input contains one integer n ($1 \le n \le 2 \cdot 10^5$).

The second line contains n integers: the elements of the sequence a, in order ($1 \le a_i \le 10^6$).

The third line contains n integers: the elements of the sequence b, in order ($1 \le b_i \le 10^6$).

Output

Print $2n - 1$ lines. On the i-th line, print the answer for the case where $k = i + 1$.

Examples

standard input	*standard output*
3 1 1 1 1 1 1	2 6 12 16 18
5 3 7 1 8 3 7 10 5 3 4	10 37 70 114 165 206 230 248 255
1 3 5	8